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Low latitude electron temperature observed by the CHAMP satellite

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In recent years a growing number of satellite measurements in the ionosphere and thermosphere provide long and continuous data records which enable the investigation of climatological trends and the quantification of regular variations or isolated events. The CHAMP mission provides a valuable base of in situ measurements of the ionosphere and thermosphere between 300 and 400 km altitude and for years from 2000 to 2010. In our presentation we will discuss an example of the analysis of observed electron temperature (T_e) and density together with physics based model results investigating the equatorial T_e morning overshoot (MO). Both, data and model revealed an anti-correlation between the equatorial MO amplitude and solar EUV flux at these altitudes. The CHAMP observations also reveal a post sunset electron temperature anomaly in analogy to the equatorial ionisation anomaly at altitudes below 400 km, although this was not predicted by earlier models. The temperature peaks coincides with the density peaks and are increased during high solar flux.

Even more extended possibilities in investigating the ionosphere/thermosphere system are expected from the ESA Swarm satellite constellation mission. Provided products relevant for investigating the near Earth Space will be presented.